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Remarks

Claims 1-10, 13, and 15-21 are pending in this application. Claims 17-21 have been withdrawn from consideration. This Response amends claim 1.

Claims 1-10, 13, 15, and 16 have been rejected for obviousness. This is the only remaining rejection in this application. All other rejections have been withdrawn. Applicants respectfully request reconsideration of the rejected claims in light of the above amendment and the following remarks.

Support for the Amendment

Claim 1 has been amended to recite the shear strength of the foamed pressure sensitive adhesive article. Support for this amendment is found, for example, on page 3, lines 1-4. No new matter is added by this amendment.

Interview Summary

The undersigned thanks the Examiner for the telephonic interview that was held on July 19, 2004. Inventors Ashish K. Khandpur, Mark D. Gehlsen, and Kenneth J. Hanley, along with the undersigned, participated in the interview. During the interview, the rejection of claims 1-10, 13, 15, and 16 under 35 USC § 103(a) as being unpatentable over Gehlsen et al. (U.S. Patent No. 6,103,152) was discussed. Applicants pointed out the distinctions between the Gehlsen patent and the presently claimed invention. In particular, Applicants noted that the Gehlsen patent does not teach or suggest any means for providing a foamed article having high shear strength without extensive crosslinking. In contrast, the present invention provides foamed articles having high shear strength without the need for crosslinking. In order to more clearly distinguish the present claims from the teachings of Gehlsen, Applicants agreed to amend claim 1 to further define the shear strength of the foamed article.

The Examiner indicated that, in addition to this amendment, evidence was needed to establish that the presently claimed invention is not a mere optimization of the methods described in the Gehlsen patent. Applicants agreed to submit a Declaration of an inventor stating that one skilled in the art would not have considered it an obvious optimization to provide a foamed PSA article with little or no cross-linking, i.e. a gel content of less than 25%, that was able to provide the

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shear strength performance recited in the amended claims. The Examiner stated that with the above amendment to claim 1 and submission of an appropriate Declaration, he would recommend allowance of this application to his supervisor.

§ 103 Rejections

Claims 1-10, 13, 15, and 16 stand rejected under 35 USC § 103(a) as being unpatentable over Gehlsen et al. (U.S. Patent No. 6,103,152). Applicants respectfully traverse this rejection as applied to the amended claims.

The present invention features a foamed pressure sensitive adhesive (PSA) article comprising a polymeric mixture containing at least one styrenic block copolymer and at least one polyarylene oxide polymer. The foamed PSA article has high shear strength at high temperatures (i.e. a shear holding power of at least 3000 minutes on anodized aluminum at a temperature of 70°C as determined by ASTM 3654 utilizing a sample with dimensions of 25.4 mm by 12.7 mm supporting a 500 g mass) with little or no cross-linking (i.e. a gel content of less than 25%).

The Examiner asserts that the presently claimed invention is obvious over the Gehlsen patent because "Gehlsen clearly teaches that crosslinking is an optional method to improve the cohesive strength and/or modulus, and it would have been obvious to one of ordinary skill in the adhesive art to lightly crosslink the adhesive article to a suitable degree (i.e. low gel content), since high crosslinking density (i.e. high gel content) would be inherently detrimental to its pressure sensitive adhesive properties. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art." (Office Action, p. 3) From these statements, it appears to be the Examiner's belief that the present invention involves merely the discovery of an optimum level of crosslinking, i.e. a level of crosslinking in which the article is sufficiently crosslinked to improve high temperature performance, but not crosslinked so much that the adhesive properties of the article have been compromised. However, the present invention is far more than the discovery of an optimum range or level of crosslinking. On the contrary, the present invention does not use crosslinking at all to provide high temperature performance. Indeed, one of the principal advantages of the present invention is that it provides an alternative means to achieve

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high temperature performance in a foamed article without the need to crosslink. In the present invention, high temperature performance is accomplished, for example, via the formation of a network of microphase separated domains formed by the hard styrenic blocks being swollen by the polyarylene oxide (see page 2 of the specification). Thus good shear performance at high temperature can be achieved for the first time without the drawbacks of extensive crosslinking identified by the Examiner (i.e., interference with PSA properties).

Gehlsen does not teach or suggest that high cohesive strength and/or high modulus can be achieved without crosslinking or even with "light" crosslinking, and Gehlsen fails to describe any means for obtaining these properties without extensive crosslinking. Applicants discovery of an alternative means for providing such properties under high temperature conditions without the need to crosslink the material thus constitutes a non-obvious improvement of the foams described in Gehlsen and more than a mere optimization of the Gehlsen methods.

In support of Applicants' arguments that the present invention involves more than a mere optimization of the Gehlsen methods, Applicants submit herewith a Declaration under 37 C.F.R. § 1.132 signed by Dr. Ashish K. Khandpur (the "Khandpur Declaration"), an inventor of the presently claimed invention and an individual skilled in the relevant art. In particular, Dr. Khandpur states that "since extensive crosslinking is the conventional means for providing foamed articles with shear strength that is described by the Gehlsen patent, it would require more than mere optimization of the methods taught by Gehlsen for one of ordinary skill in the art to obtain a pressure sensitive adhesive foam article having a high shear strength ... with little or no crosslinking." (Khandpur Declaration, ¶ 9).

As pointed out in the Khandpur Declaration (¶ 7) and in Applicants previous reply, Examples 62-70 of Gehlsen (cols. 22-23), describe foams that were prepared without crosslinking (col. 22, lines 14-15) and the shear strength was measured and reported in Table 2 (col. 23, lines 1-15). All of Gehlsen's non-crosslinked foams exhibited low shear strength with failure occurring in less than 200 minutes under a 1000g load at 25°C (see 6th column of Table 2). In contrast, when the Gehlsen foams were crosslinked, they exhibited a much higher shear strength, with generally no failures occurring within 10,000 minutes (see 12th column of Table 1). Clearly, the data presented in the Gehlsen patent show that Gehlsen's non-crosslinked foams exhibited very low shear strength compared to the crosslinked foams. Only when Gehlsen's

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foams were substantially crosslinked did they exhibit a high shear strength. Moreover, the shear strength test used by Gehlsen was performed at 25°C and thus the shear strength of these foams would be expected to be even lower when measured at the higher temperature conditions (70°C) recited in claims 1, 13, and 16 of the present invention. Thus, a skilled artisan desiring to provide a foamed article having high shear strength would have been motivated by Gehlsen to extensively crosslink the foamed article, especially if high temperature performance was desired. Nothing in Gehlsen suggests an alternative means for providing high shear strength. Moreoever, a skilled artisan would not have had a reasonable expectation that high shear strength at high temperature conditions could have been successfully achieved without extensive crosslinking.

The present invention, on the other hand, provides a foamed article that has high shear strength at high temperature conditions without the need to crosslink the material. Although the foams of the present invention may optionally be subjected to a small degree of crosslinking, in contrast to the teachings of Gehlsen this crosslinking is completely unncessary in order to provide high temperature performance and extensive crosslinking is to be avoided (i.e. gel content less than 25%). Gehlsen fails to teach or suggest a foamed article that has little or no crosslinking (i.e. low gel content) while still exhibiting the high degree of shear strength recited in claims 1, 13 and 16, nor does Gehlsen teach any method for achieving such performance without crosslinking. For these reasons, Applicants submit that claims 1, 13, and 16, and those claims that depend therefrom, are patentable over Gehlsen. Thus, Applicants respectfully submit that the rejection of claims 1-10, 12, 13-15, and 16 under 37 U.S.C. §103 as being unpatentable over Gehlsen has been overcome and should be withdrawn.

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In view of the foregoing amendments and remarks, it is submitted that the application is in condition for allowance. Reconsideration of the application is requested.

Allowance of claims 1-10, 13, 15, and 16, as amended, at an early date is solicited.

All communications in this case should be directed to the undersigned. If the Examiner believes a telephone discussion would be helpful to resolve any outstanding issues in this case, the Examiner is encouraged to call the undersigned at the number listed below.

Respectfully submitted,

July 21, 2004
Date

By:


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